HT-IDE3000 User's Guide for HT86 Voice Series

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Preface

The HT86XXX is Holtek's voice synthesizer MCU series. Holtek provides software utility and function library to help the user accomplish his project easily. This Programmer's Guide is helpful for the programmer who wants to learn how to use the voice resources in the HT-IDE3000 system.

Chapter 1

Using HT-VROM Manager

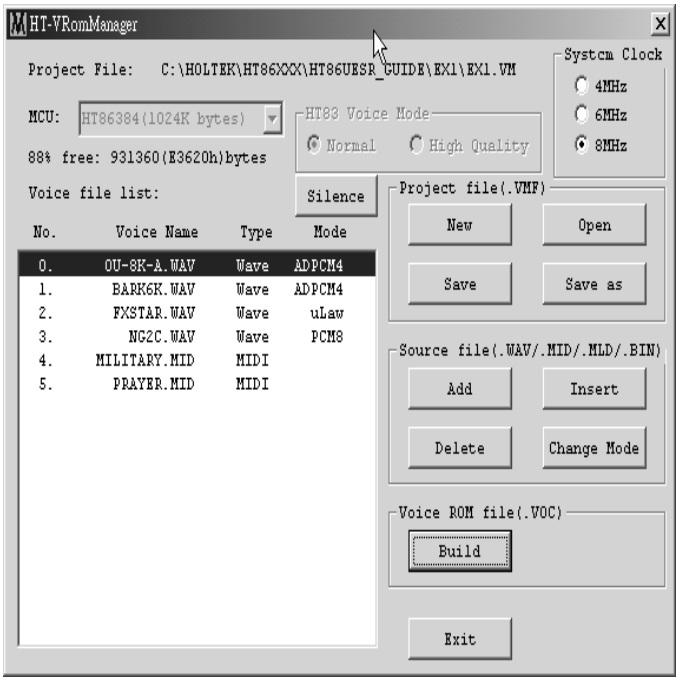
1

A voice ROM file (.VOC) should be prepared in advance in order to play voice files in HT86XXX project. Holtek provides a software utility HT-VROM Manager for the user to build his .VOC file. This chapter gives a brief description of the HT-VROM Manager.

Start HT-VROM Manager from HT-IDE3000

Click the <Tools\Voice\VROM Manager> button and execute it.

Shown below is the main window of HT-VROM Manager.

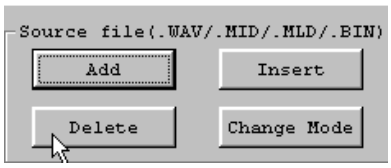


→ **Function descriptions for HT-VROM Manager**

- Project file (.VMF) Functions

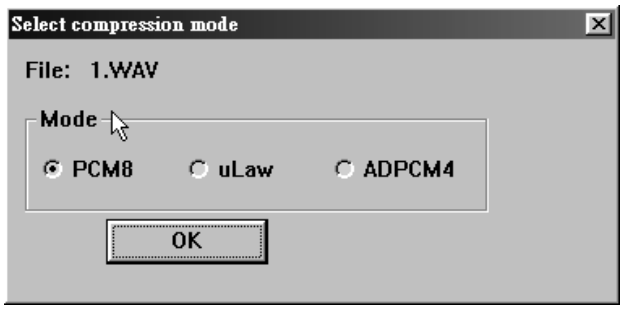
New: Create a new project, use the file browser to specify the project path name.
Open: Open an existing project
Save: Save the current project
Save As: Save the current project with another file name

- Source files (.WAV/.MID/.MLD/.BIN) Functions

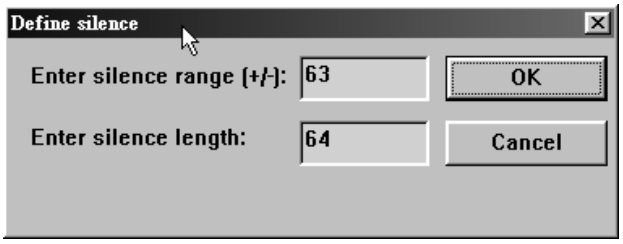


Add: Add a source file at the end of the voice file list.
Insert: Insert a source file after the selected item in the file list.
Delete: Remove the selected item in the voice file list from the project.

Change Mode: Change the compression method for the selected WAV file.



Silence: Define the silence length and range in a WAV file.



- Voice ROM file (.VOC) Functions
  Build: Make the Voice ROM file (.VOC)

  If the .VOC is generated successfully, the HT-VROM Manager will also generate two files (.HED & .NUM) for the programmer.

  .HED file contains some definitions for the voice functions. The programmer often include this .Hed file at the beginning of his program.

  .NUM file contains the information for each voice file such as offset in .VOC file, file type (MIDI/WAV/BIN), and compression mode if it's a WAV file.

The following lines show an example of .NUM file:

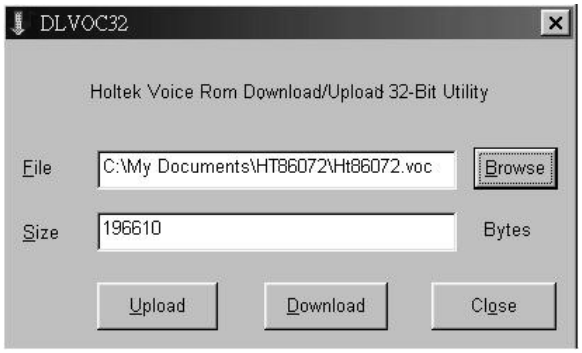
```
0 00000020h BACH.MID       MID
1 00000820h 90071.MLD      MLD
2 00000CF0h SANTA6K.WAV    WAV/PCM8    SampleRate:6000
3 00010800h CHIP04.WAV     WAV/UPCM    SampleRate:8000
4 00012130h CLOW5K.WAV     WAV/AD4     SampleRate:5000
5 00017710h FXSTAR.WAV     WAV/AD4     SampleRate:8000
6 000185E0h C.WAV          WAV/UPCM    SampleRate:8000
7 000197A0h SPCTD01.BIN    BIN
```

After the .VOC file is built OK, you can use DLVOC32 software utility to download it to the HT-ICE.

To Start DLVOC32 from HT-IDE3000

Click <Tools\Voice\Download> button and execute it.

The DLVOC32 main window is shown as follows

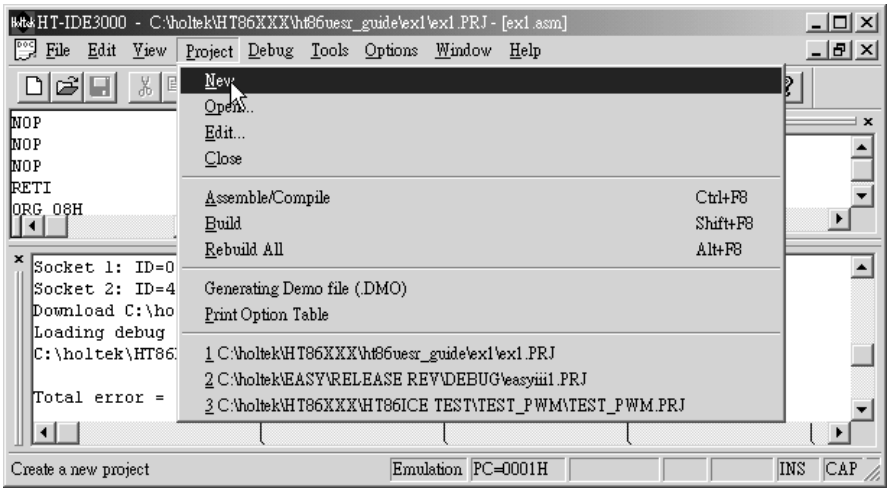


Chapter 2

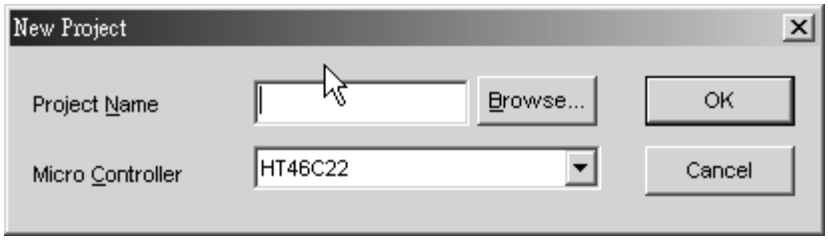
Creating and Verifying an HT86XXX Project

2

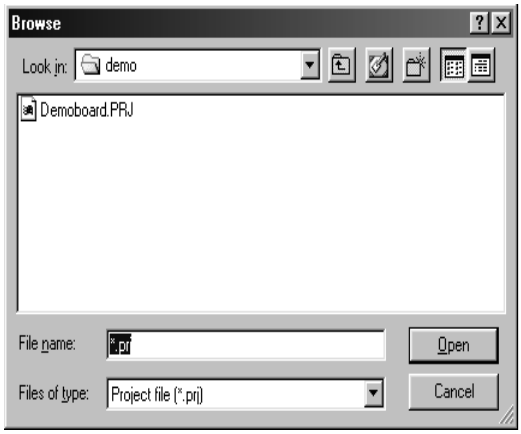
Creating a New Project



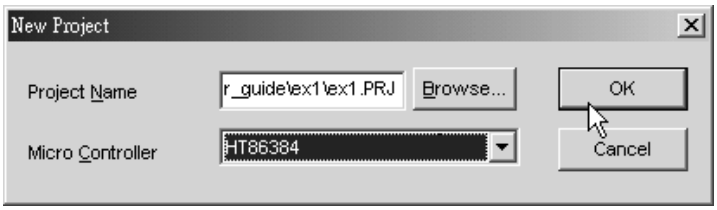
Click <Project\New> button and the following dialog will be shown



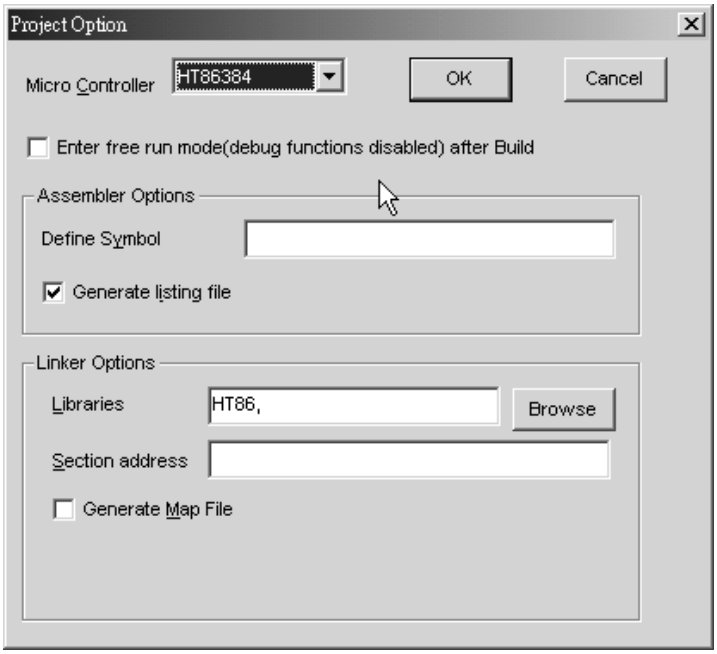
Click the <Browse> button and the following dialog will be shown



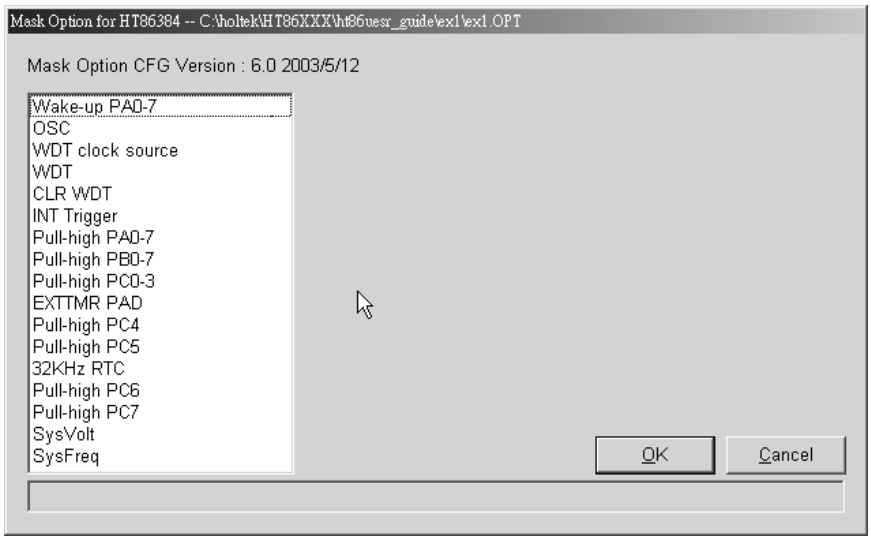
After creating the project name, click the <Open> button and the following dialog will be shown



Select a microcontroller, then click the <OK> button and the following dialog will be shown

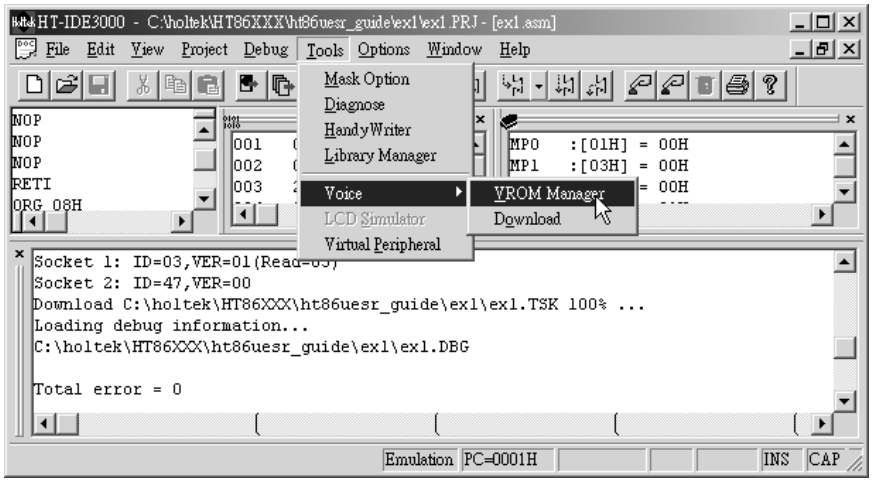


Click the <OK> button and the following dialog will be shown
After creating the Project Option, the HT-IDE will automatically open the Mask Option compiler.

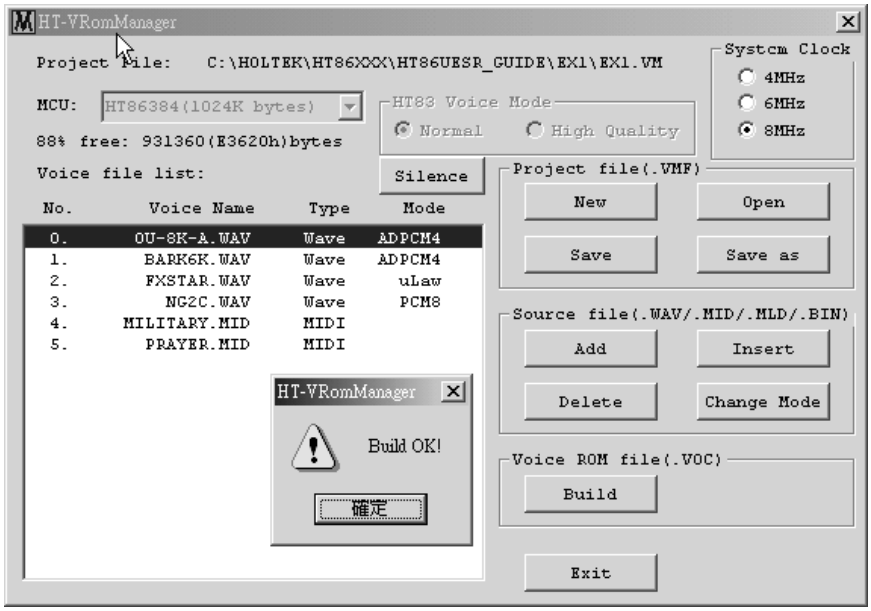


After selecting from the list, click the <OK> button to save.

Editing VROM

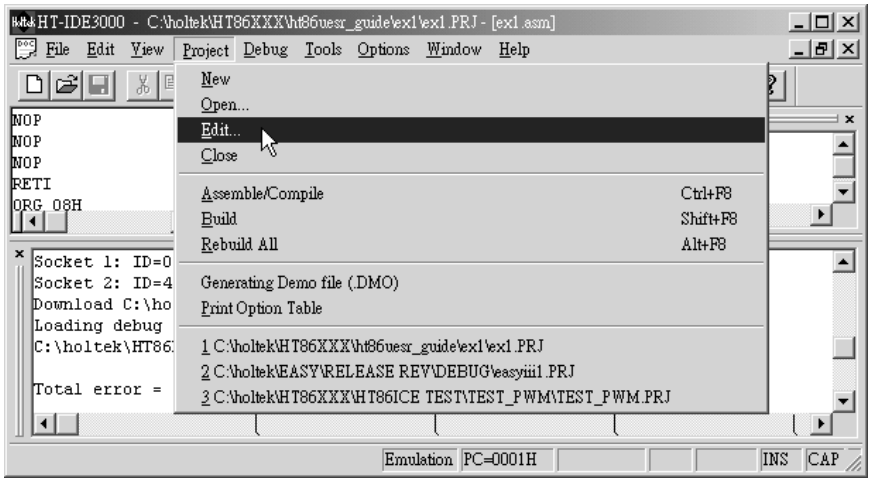


Click the <Tool\Voice\VROM Manager> button and the following dialog will be shown

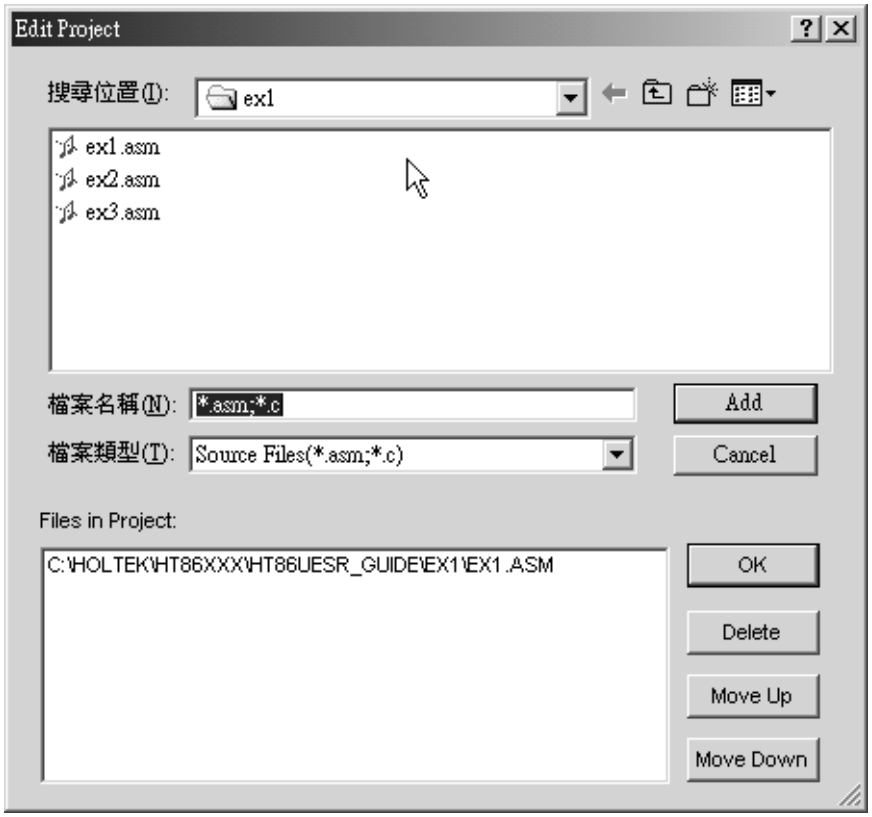


After editing the VROM, click the <Build> button to produce .hed file, .num file and .voc file For the HT-VROM Manager descriptions, refer to Chapter 1.

Editing Resource File (XX.asm)

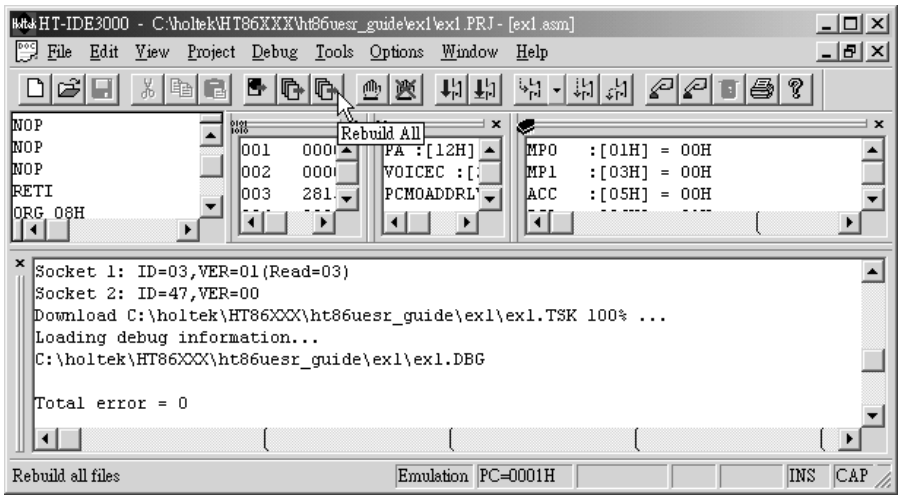


Click the <Project\Edit> button and the following dialog will be shown

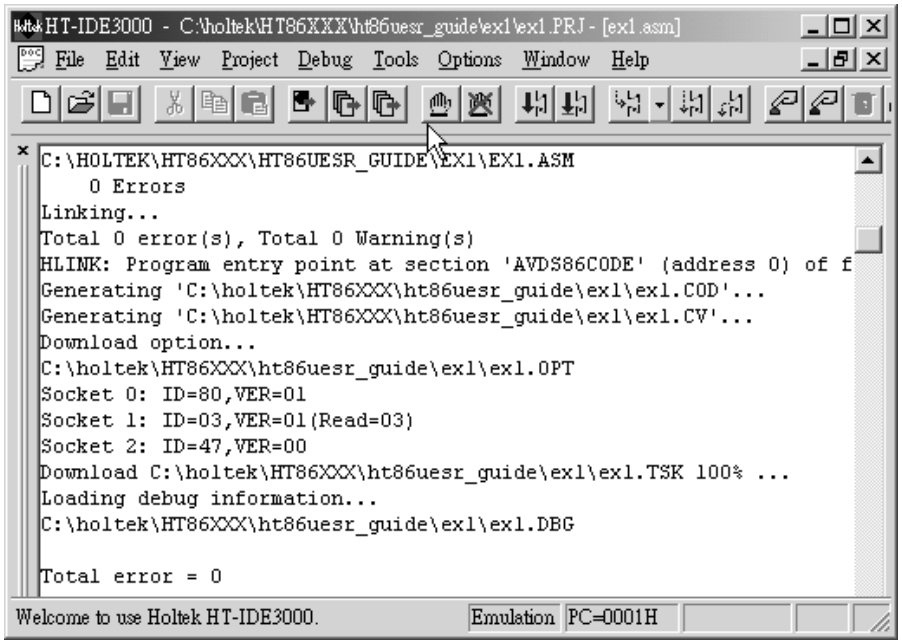


After selecting the resource file (XX.asm), click the <OK> button

Building File



Click <Build All> button and the following dialog will be shown
Generating "*.cod" at output windows.



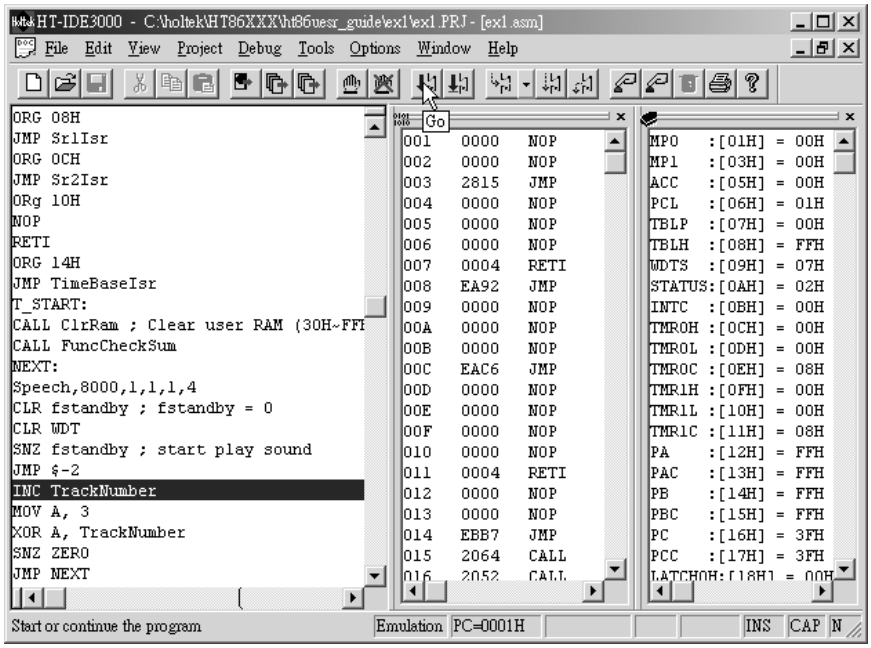
You can download *.cod into the Flash ROM by using a ROM writer.
Then emulate the code on HT86P00 EV board.

Download "*.VOC" to HT-IDE3000

- Step 1
  Click the <Tool\Voice\Download> button
- Step 2
  Click the <Download> button and download "*.VOC" to HT-IDE3000

For the HT-VROM Manager description, refer to chapter 1.

Emulation of Application Program

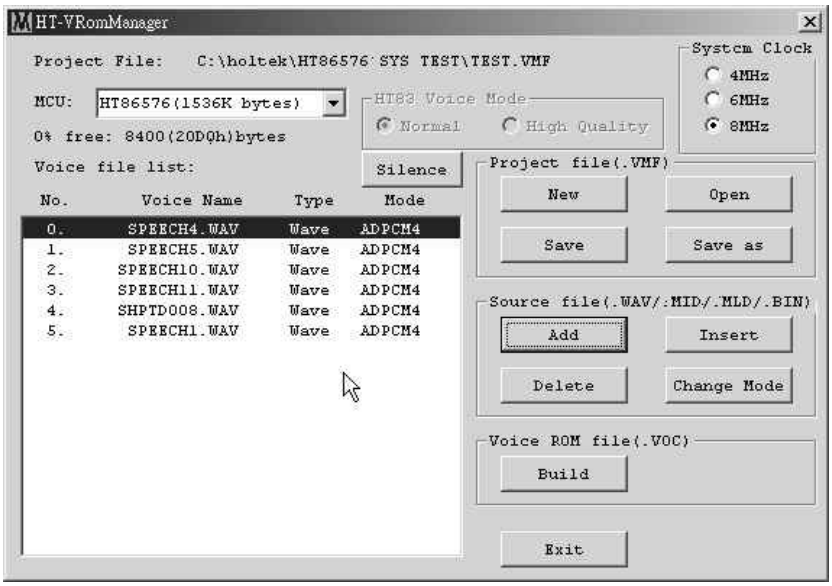


Creating HT86576/HT86768 Project

The HT-IDE3000 supports VROM for the HT86384, if you want to edit HT86576/HT86768 project, the following dialog will be shown

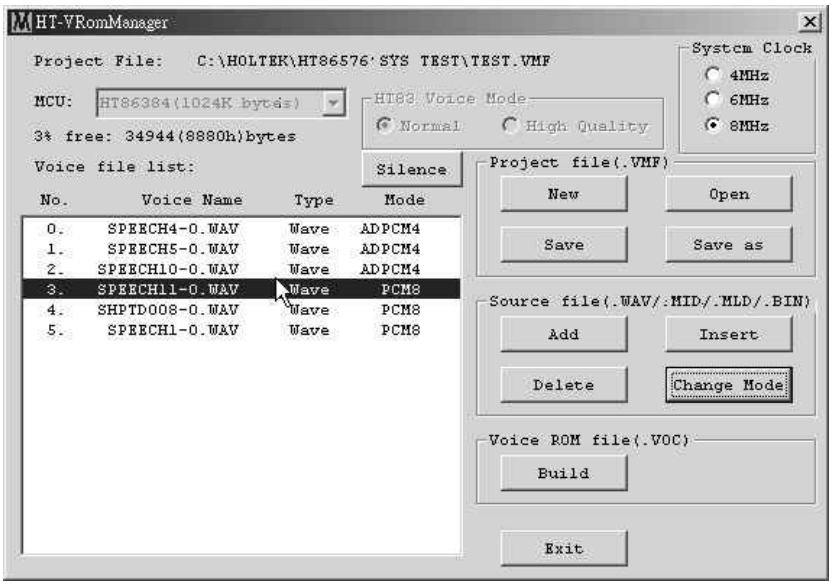
The following steps should be carried out.

- Step 1
  Edit VROM by using the HT-VROM Manager to ensure that the VROM size ok.



- Step 2
  All source files (.wav/mid/mld/bin) are divided to be smaller than 1M, and save as new files.

- Step 3
  Select MCU HT-86384 to emulate on HT-IDE3000.



- Step 4
  If your program code is ok after emulating on HT-IDE3000, you can create a new project and select MCU HT-86576/768, edit the same resource file to compile and build.

- Step 5
  Download ″*.cod″ into the Flash ROM by using a ROM writer, then emulate the code on HT86P00 EV board.

Chapter 3

Playing Voice in the Program

3

Holtek provides some voice playing functions so that the user can develop his project easily. To use the voice functions defined in Holtek's HT86 Library, the following steps should be carried out:

Step1 – Add the following line at the beginning of the program.

```
#include xx.hed   ; header file generated by HT-VROM Manager
```

Step 2 – Add #define RTC if real time clock is to be used.

- Syntax

```
#define RTC           ; select Tools/Mask Option/32kHz RTC\Enable at the
                      ; same time
```

Step 3 – Add #define HT82V733PXN if PXN is to be used as voice output.

- Syntax

```
#define HT82V733PXN   ; X=A,B,C, N=0..7
```

- Example

```
#define HT82V733PC0   ; select the PC0 to enable the HT82V733 OP IC
```

Steps 4 – Call the following macros and library functions in your program.

→ **Speech macro**

This is used to play a sound that has been previously composed through VREDIT utility.

- Syntax

  speech [*TrackNumber*], [*SamplingRate*], [*fVoiceDown*], [*fChannelNo*], [fVoiceUp], [Volume]

  All parameters should be specified first before executing the ″speech....″ command.

- Description

  TrackNumber – TrackNumber, TrackNumber 2

  The index number shown on the voice file list of the HT-VROM Manager is the playing sound's TrackNumber. Refer to the .NUM file generated by the HT-VROM Manager for a listing of all the composed sound sources. Note that TrackNumber is a number which ranges from 0...255.
  If this argument is empty, then the previous track number is assumed.

SamplingRate
Specify the sampling rate for the playing sound. The accepted range is from 2000 to 24000. The maximum support sampling rate indicates the encoding algorithm and the selected system frequency. Refer to the SamplingRate macro for detailed listing table. **Note that regardless of the output channel selected, the assigned sampling rate is emulated through SR1 interrupt.**
If this argument is empty, then the program is wrong.

fVoiceDown
Set this flag as 1 to clear the AUD output when the sound ends in order to save power consumption. **If this argument is empty, then 0 is assumed**.

fChannelNo
If this argument is empty, then timer 0 is assumed.
fChannelNo=0: TIMER0
fChannelNo=other: TIMER1

fVoiceUp
Set this flag as 1 to raise the voice up and to minimize noise while the sound starts. It will enable the DAC circuit. If this argument is empty, then 0 is assumed.
However, while using the speech macro, the flag fVoiceUp is set to 1.

Volume
Set the volume value ranging from 1...7, if volume ≠ 1...7, then volume=7 is assumed.

- Example:

```
Speech 0, 6000, 1, 0, 1, 7      ; Play sound in track 0 under 6000Hz
                                ; sampling rate to channel 1
Speech 4, 6000, 1, 1, 1, 7      ; Play sound in track 4 under 6000Hz
                                ; sampling rate to channel 2
```

→ **SamplingRate macro**

Assign sampling rate (or occurrence rate) for SR1 interrupt.

- Syntax

```
SamplingRate channel, SamplingRate
```

- Description
  Channel
  1 to represent interrupt SR1, respectively
  2 to represent interrupt SR2, respectively

  SamplingRate
  Specify the sampling rate (or occurrence rate) for the selected channel interrupt. The accepted range is from 2000 to 24000.

  Note that to take advantage of the SamplingRate macro for a fixed time to interrupt, user has to enable the corresponding interrupt bit first (by setting the INTC register).

If speech macro is applied, maximum sampling rate is constrained by the encoding algorithm and chosen system frequency, the table lists the experimental maximum sampling rate.

Encode\SysFreq	4MHz	6MHz	8MHz
8 bit PCM	12kHz	20kHz	24kHz
6 bit PCM	11kHz	16kHz	22kHz
4 bit ADPCM	11kHz	16kHz	22kHz

Maximum Support Sampling Rate

- Example:

```
SamplingRate 1, 8000
```

Set sampling rate of channel 1 to 8000Hz. That is, set channel 1 interrupt to occur for every 1/8000 second.

→ **SetAddress & ReadByte macro**

Used to access common data from Voice ROM. (Macro Version)

- Syntax

```
SetAddress    Address
ReadByte
```

- Description

The read data will be placed on the accumulator.

- Example

Read constant data from Voice ROM at `013F80H` to variable "DataStore".

```
SetAddress    013F80H
ReadByte
Mov           DataStore, A
```

→ **FuncSetAddress & FuncReadByte procedure**

- Syntax

```
call  FuncSetAddress
call  FuncReadByte
```

- Description

Used to access common data from Voice ROM. (Procedure Version) Public data RAM *AddrL*, *AddrM*, and *AddrH* are used for the source address. Read data will be placed on the accumulator.

- Example

Read constant data from Voice ROM at 013F80H to variable "DataStore".

```
mov   A,01H
mov   AddrH,A
mov   A,3FH
mov   AddrM,A
mov   A,80H
mov   AddrL,A
call  FuncSetAddress
call  FuncReadByte
mov   DataStore,A
```

Note Macro SetAddress, ReadByte and Procedure FuncSetAddress, FuncReadByte can only be used when fStandBy flag is set or 08H/0CH/14H interrupts are disabled.

→ **FuncCheckSum**

- Syntax
  `call FunCheckSum`
- Description
  Check whether the voice ROM is ready.
  This function must be called before playing sound. It will enable the VROM circuit.

→ **InitTimeBase**

- Syntax
  `call InitTimeBase`
- Description
  Setup 1ms time base for the melody sound source.

→ **ClrRAM**

- Syntax
  `call ClrRAM`
- Description
  Clear all RAM from 30h~FFh

→ **Variable TrackNumber – TrackNumber, TrackNumber 2**
TrackNumber records the track number being played or about to be played. Users may read *TrackNumber* while some sound is playing (i.e. *fStandBy* is 0) or write it as the next track number of speech macro when *fStandBy* is set. The range of the TrackNumber is from 0 to 255.

→ **Flag fStandBy – fStandBy, fStandBy 2**
fStandBy is a bit flag denoting whether some sound is being played or not. If it is set then no sound is being played.
Take note, the initial value of *fStandBy* is unknown after power supply is turned on. In other words, the *fStandBy* must be equal to ″1″ after the initial power on. So set this flag before the first ″speech , , , , ,″ command .

→ **Flag fPause**
fPause is a bit flag that can be read or written into. If it is set, sound playing is temporarily stopped until it is cleared.

→ **Flag fStop**
fStop is a bit flag. If it is set, the currently playing sound is stopped and terminated. User has to invoke *speech* macro to play it again. Before you use flag fStop, you must call command ″call InitTimeBase″.

→ **Variable V_{OL}**
The variable V_{OL} are located at the special RAM 29H. Only the high nibble is valid and used to indicate the volume.

→ **Variable**

Since all the interrupts are occupied by the HT86 library, the library provides a software down counter, variable `TimeBaseCnt`, for user application program to determine a fixed time period. ***TimeBaseCnt* decrements at fixed time slice if some sound is playing by speech macro (*fStandBy* flag is 0) or the time base interrupt is enabled.** User program has to poll `TimeBaseCnt` and manually reload it when `TimeBaseCnt` decrements to 0. The fixed time slice is 1ms.

The following table lists the name and description of the macros and functions defined in HT86 library.

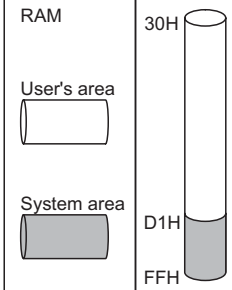
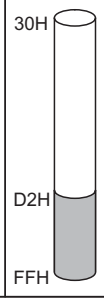
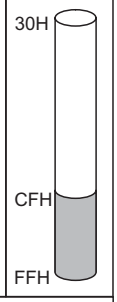
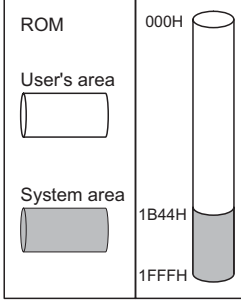
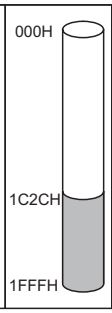
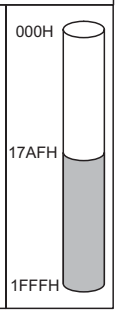
Name	Description
Speech	MACRO to play a voice file
SamplingRate	MACRO to specify the sampling rate for the voice file to be played
SetAddress	MACRO to setup address for download data
ReadByte	MACRO to read data from voice ROM to ACC
FuncSetAddress	Function to setup address for downloading data
FuncReadByte	Function to read data from voice ROM to ACC
FuncCheckSum	Function to check whether the voice ROM is ready
InitTimeBase	Function to setup 1ms time base for the melody file
ClrRAM	Function to clear the RAM from 30h~FFh

The following tables lists the public variable and flag name defined in HT86 library

Variable/Flag	Description
TrackNumber TrackNumber 2	Track number (0~255)
VolTmp	Volume
AddrL/AddrM/AddrH	Address for download
VdsStatusFlag	Status flag
TimeBaseCnt	Time base count
DataCode	Library subroutine return code
TimerL/TimerH	Timer low/high byte
ChannelNumber	SR number
fStandBy fStandBy 2	Standby flag (0: busy; 1: end of segment)
fPause	Pause flag, set to pause the current playing
fStop	Stop flag, set to stop the current playing
fVoiceUp	Voice up flag, set to enable the DAC circuit before the sound starts
fVoiceDown	Voice down flag, set to clear the AUD when the sound ends
fChannelNo	Channel number (0: TIMER 0; Other: TIMER 1)
fRTC	RTC enable flag, set to enable the RTC

Resource Consumption

Some C resources are occupied the VDS86 library. The kind of composed sound source and applied encoding algorithm determined its resource consumption is. Different resource consumption are categorized into seven groups as shown in the following table.

Compressing Algorithm		ADPCM	Melody PCM8 μ'PCM	ADPCM Melody PCM8 μ'PCM
RAM User's area System area				
Variable & flag	FFH	TrackNumber		
	FEH	AddrH		
	FDH	AddrM		
	FCH	AddrL		
	FBH	Bit0, fStandBy		
		Bit 1, fPausse		
		Bit 2, fStop		
		Bit 3, fNoteChanged		
		Bit 4, fVoiceDown		
		Bit 7, invalid		
		Bit 6, fVoiceUp		
		Bit 7, invalid		
	F6H	Voltmp		
	F5H	Bit1, fStandBy 2		
	F2H	TrackNumber 2		
ROM User's area System area				

Example 1

TrackNumber and fStandBy

```
#DEFINE     RTC
#Include    Ex1.hed
;*********************************************
AVds86Code     .section at 0H     'code'
  ORG    00H
  NOP
  NOP
  NOP
  JMP    T_START
  ORG    04H
  NOP
  NOP
  NOP
  RETI
  ORG    08H
  JMP    Sr1Isr
  ORG    0CH
  JMP    Sr2Isr
  ORG    10H
  NOP
  RETI
  ORG    14H
  JMP    TimeBaseIsr
T_START:
  CALL                      ; Clear user RAM (30H~FFH)
  CALL   FuncCheckSum
NEXT:
  Speech,8000,1,0,1,4       ; play sound to channel 1
  CLR    fStandBy           ; fStandBy= 0
  CLR    WDT
  SNZ    fStandBy           ; start play sound
  JMP    $-2
  INC    TrackNumber
  MOV    A, 3
  XOR    A, TrackNumber
  SNZ    ZERO
  JMP    NEXT
  CLR    WDT
  JMP    $-1
  END
```

Example 2

fStop

```
#DEFINE RTC
#include Ex1.hed
;*********************************************
AVds86Code     .section at 0H     'code'
  ORG    00H
  NOP
  NOP
  NOP
  JMP    T_START
  ORG    04H
  NOP
  NOP
  NOP
  RETI
  ORG    08H
  JMP    Sr1Isr
  ORG    0CH
  JMP    Sr2Isr
  ORG    10H
  NOP
  RETI
  ORG    14H
  JMP    TimeBaseIsr
T_START:
  CALL   ClrRam              ; Clear user RAM (30H~FFH)
  CALL   FuncCheckSum
  CALL   InitTimeBase
  SET    PAC.0
NEXT:
  Speech,8000,1,2,1,4        ; play sound to channel 2
AAA:
  CLR    WDT
  CLR    fstandby2           ; fstandby2= 0
  SNZ    PA.0
  JMP    BBB
  SNZ    fstandby2           ; start play sound
  JMP    AAA
BBB:
  SET    fstop
  CLR    WDT
  JMP    $-1
  END
```

Example 3

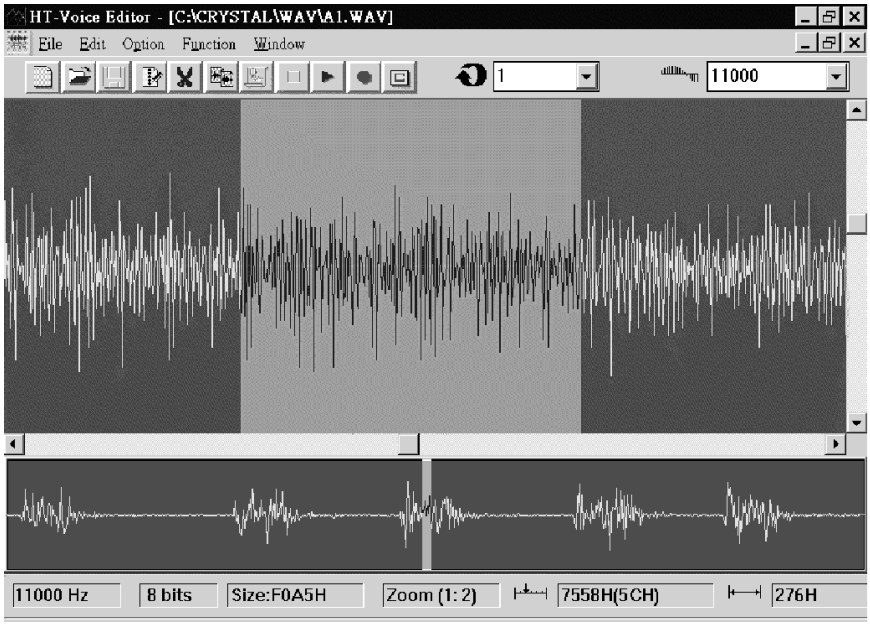
```
#DEFINE RTC
#include Ex1.hed
;***********************************************
AVds86Code     .section at 0H     'code'
  ORG   00H
  NOP
  NOP
  NOP
  JMP   T_START
  ORG   04H
  NOP
  NOP
  NOP
  RETI
  ORG   08H
  JMP   Sr1Isr
  ORG   0CH
  JMP   Sr2Isr
  ORG   10H
  NOP
  RETI
  ORG   14H
  JMP   TimeBaseIsr
T_START:
  CALL  ClrRam              ; Clear user RAM (30H~FFH)
  CALL  FuncCheckSum
  SET   PAC.0
NEXT:
  Speech,8000,1,0,1,4       ; play sound to channel 1
AAA:
    WDT
  CLR   fstandby            ; fstandby= 0
  SNZ   PA.0
  JMP   BBB
  SNZ   fstandby            ; start play sound
  JMP   AAA
  CLR   WDT
  JMP   $-1
BBB:
  CLR   WDT
  SET   fpause
  SNZ   PA.0
  JMP   BBB
  CLR   fpause
  JMP   AAA
  END
```

Chapter 4

HT-VOICE Editor

4

The main screen of the HT-Voice Editor is shown below. This chapter explains how to edit a wave file, describe all the files and the menu commands.



The Main Screen of HT-Voice

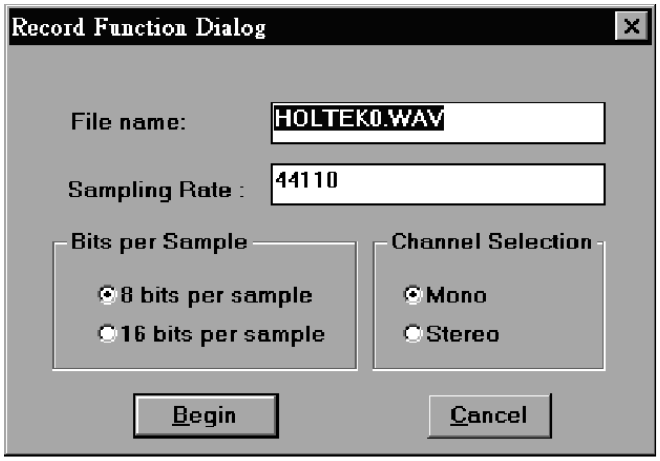
Record Command

→ **Step 1**

To create a new voice file, select the [New] command from the [File] menu.

→ **Step 2**

To record, select the [Record] command from the [Function] menu, or press the button (if a sound bluster card and microphone is available), a [Record Function Dialog] screen appears:

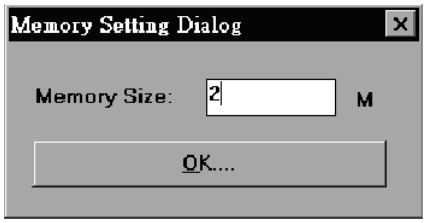


Record Function Dialog

Fill out the dialog box: File Name, Sampling Rate and other options. Press the [Begin] button to start recording.

→ **Step 3**

The default longest time you can record is 25 sec (if option is 8 bits per sample and Mono). If you need more time, select the [Memory..] command in the [Option] menu. The [Memory Setting Dialog] is shown as follows. Press the [End] button to stop recording.



Memory Setting Dialog

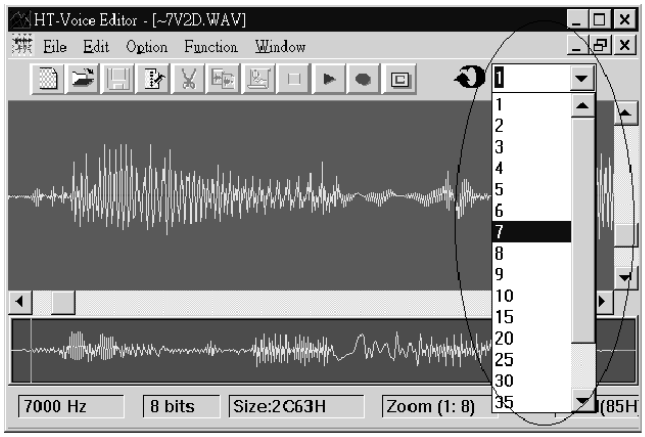
[Play] Command and Sample Rate

→ **Step 1**

Before playing, we must record or open a file. Select the [Play] command in the [Function] menu, or press the button to listen to the recorded sound. Press the button to stop.

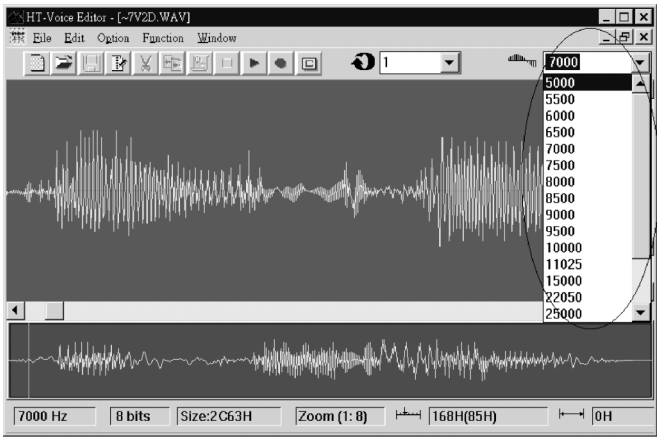
→ **Step 2**

To play a song repeatedly, select the number of times to play from the following combo box.



→ **Step 3**

You can also adjust the Sampling Rate, and then you can differentiate between the sounds produced. This command will not change the voice data, but the sampling rate when playing. Different sampling rate will come with different sounds, different frequency and speed.



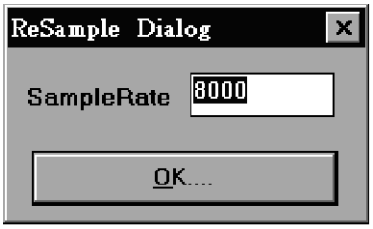
[Open] Command

→ **Step 1**
To open a voice file, select the [Open] command in the [File] menu.

→ **Step 2** – **cut/copy/paste**
Select a range first, and then cut/copy the range by selecting the [cut]/[copy] command from the [Edit] menu, or press the / button. After cutting or copying, click the [Paste] command in the [Edit] menu or the button to paste the range from the clipboard to the current position.

→ **Step 3** – **delete**
Select a range first, and then click the [Delete] command in the [Edit] menu.

→ **Step 4** – **Re-sample**
The Sample rate of the file can be changed by selecting the [ReSample] command in the [Edit] menu. The [ReSample Dialog] box is shown below:



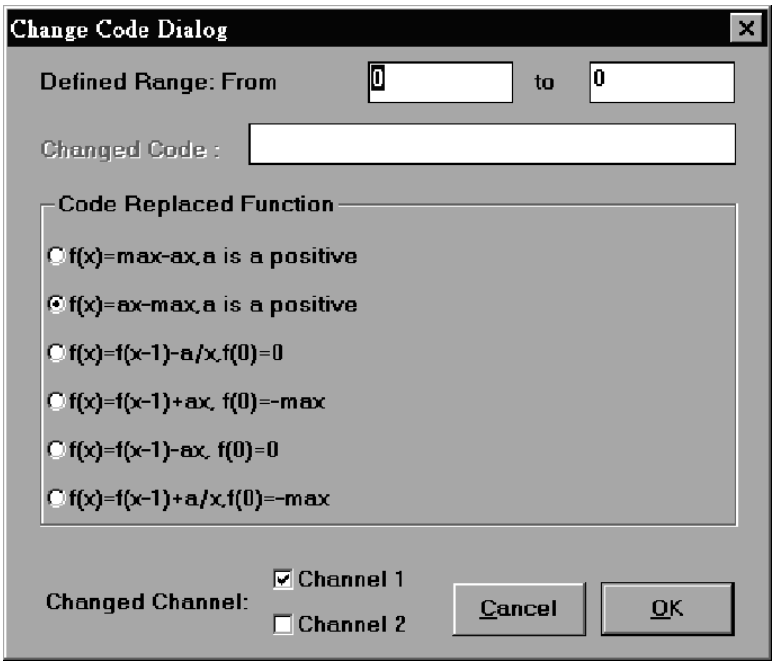
ReSample Dialog

The ReSample command will add/delete data points to suit the sampling rate you type in. If you decrease the sampling rate, the timbre will not be as good as the original voice, but the file size will be decreased.

→ **Step 5** – **Change Format**
The voice file format can be changed by selecting the [ChangeFormat] command in the [Edit] menu, or pressing the button. You can change the Sampling rate, Channel, and Bits Per Sample of this file. If we open a PCM file, the system will open it with default setting, Sampling rate 8000Hz, 1 Channel, 8 Bits Per Sample. So we can set the correct setting by using the [ChangeFormat] command.

→ **Step 6 – Change Code**

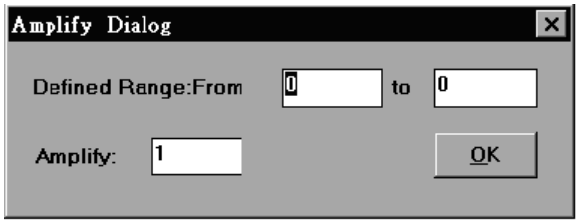
Before changing the code, you must specify a range first, or define the range in the [Change Code Dialog] box as shown below. The code can be changed by selecting the [Change Code] command in the [Edit] menu.



To replace the data marked with the code series, fill in the [Changed Code] edit box with code series, in the format of data1,data2,data3 (hex). You can also replace the data marked with the code function. Also, select which channel to be replaced by checking the [Changed Channel] check box.

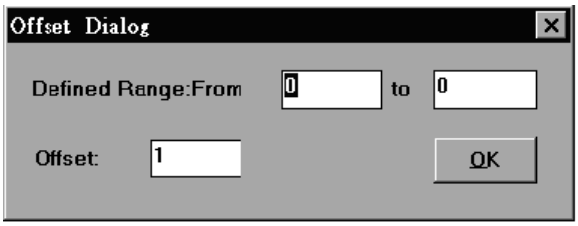
→ **Step 7 – Amplify**

Specify a range first or choose the [Amplify] command from the [Edit] menu and define the range in the [Amplify Dialog] window, and then type in the magnitude you want for the selected range to be amplified.



→ **Step 8 – Offset**

Specify a range first, or select the [Offset] command from the [Edit] menu and define a range in the [Offset Dialog] window, and type in the desired offset value. If the offset value is negative, the voice data will down offset, in other words, if the offset value is positive, the voice data will up offset.



[Save] Command and Voice Type

→ **Save**

To save a file, select the [Save] command in the [File] menu, or press the button. If the file name is not specified, the system will show a [Save As] dialogue box.

→ **Save As**

To save the current file under another name, select the [Save As] command from the [File] menu. The system will show a [Save As] dialogue.
Type in the full path, file name and the file type (Wave Files (.WAV) or Holtek PCM File (.PCM)).

→ **Save Range**

Other Commands

→ **Short Menus or Full Menus/File**
Short menu/Full menu switch command.

→ **Exit/File**
Close the application.

→ **About HT-Voice/File**
Information about this application.

→ **Tile or Arrange/Window**
Tile (it is called Arrange in short menu) all opened files on the screen.

→ **Cascade/Window**
Cascade all opened files on the screen

→ **Arrange Icons/Window**
Arrange all icons on the screen

→ **Close All/Window**
Close all opened files

File Menu

The File pop-up menu consists of New, Open, Save, Save as and Print command.

→ **New**
Create a new project

→ **Open**
Open an existing project
VOC file must exist in the same directory with .VPJ file. If not, HT-VDS84 will create a new one for you.

→ **Save**
Save the current edited project

→ **Save As**
Save the current edited project under a new file name

→ **Print**
Print the result including the file name, the starting address, and the compression methods used.

Project Menu

The File pop-up menu consists of System Clock, Silence Length, and Silence Tolerance command.

→ **System Clock**
Change the System Clock of the active project

→ **Silence Tolerance**
Change the Silence Tolerance of the active project

→ **Silence Length**
Change the Silence Length of the active project

Window Menu

The Window menu consists of Tile, Cascade, Arrange Icons, and Close All commands.

→ **Tile**
Tile all opened files on the screen

→ **Cascade**
Cascade all opened files on the screen

→ **Close all**
Close all opened project files

→ **Arrange icons**
Arrange all icons

Chapter 5

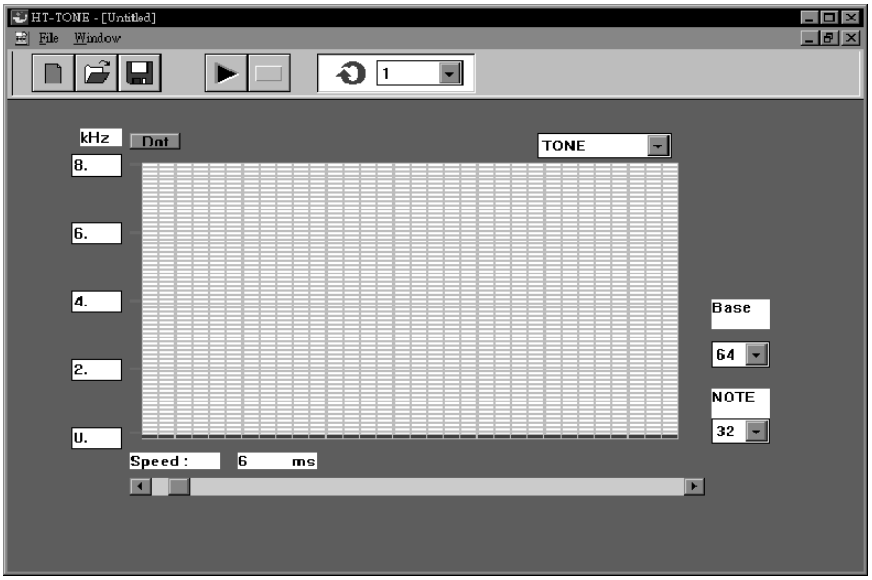
HT-Tone Editor

5

In this section, we will give an example to illustrate how to operate the HT-Tone Editor. This example is illustrated by a series of graphs for easy learning.

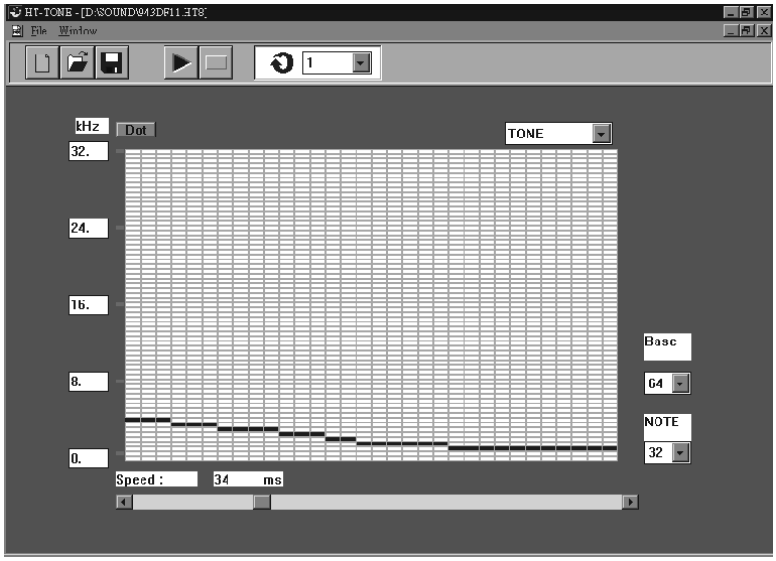
→ **Step 1**

Run HT-Tone.exe, then Select the ″New″ command from the FILE menu to open a new TONE editor. The vertical coordinate represents the Frequency, and the horizontal coordinate represents the Note number. As for the Frequency and the Note number, refer to steps 3 and 4.



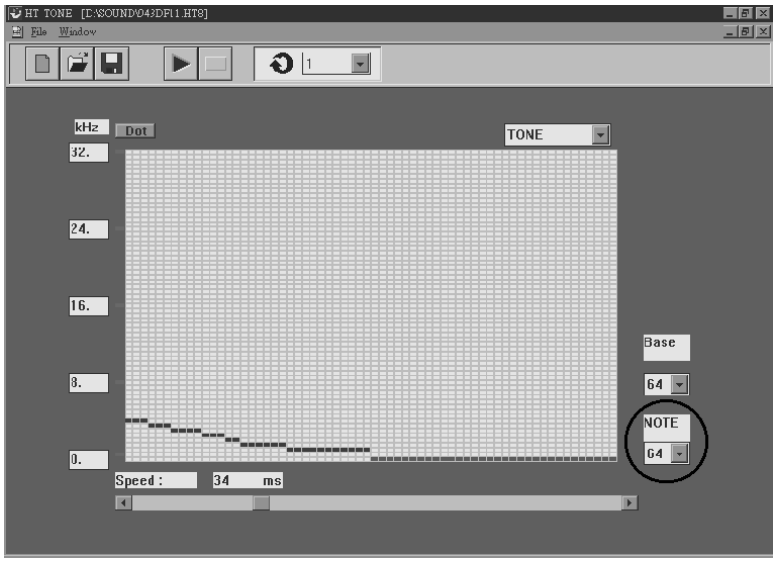
→ **Step 2**

Press the mouse left button and move the mouse, a curve will be produced in the window.



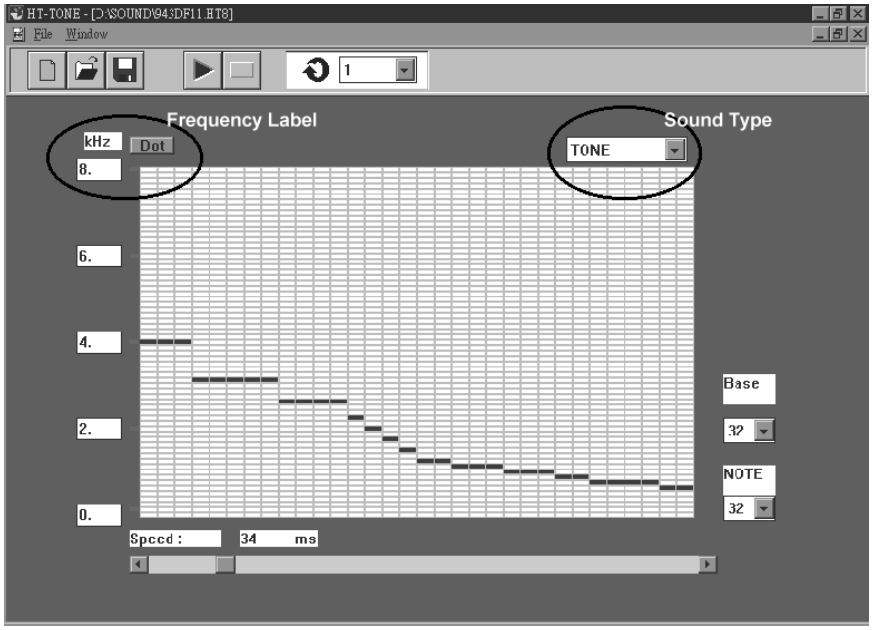
→ **Step 3 – NOTE Number**

Holtek has two types of Tone formats: 64 Note and 32 Note. A frequency can be assigned to each note. It means that Tone file can play either 32 or 64 monotony. Change the note number by changing the selection of the ″NOTE″ combo box. The Fig below is an example of changing note 32 to note 64.



→ **Step 4 – BASE Frequency**

Change the Base Frequency by selecting item from the ″BASE″ combo box. For example: if the Base Frequency is 64K, the max. frequency we can use is 32K.



→ **Step 5 – Sound Type**

The system supports three kinds of sound type: TONE, NOISE, TONE+NOISE. This function will change the timbre. We can change the Sound Type, and press the [Play] button to audition the effect.

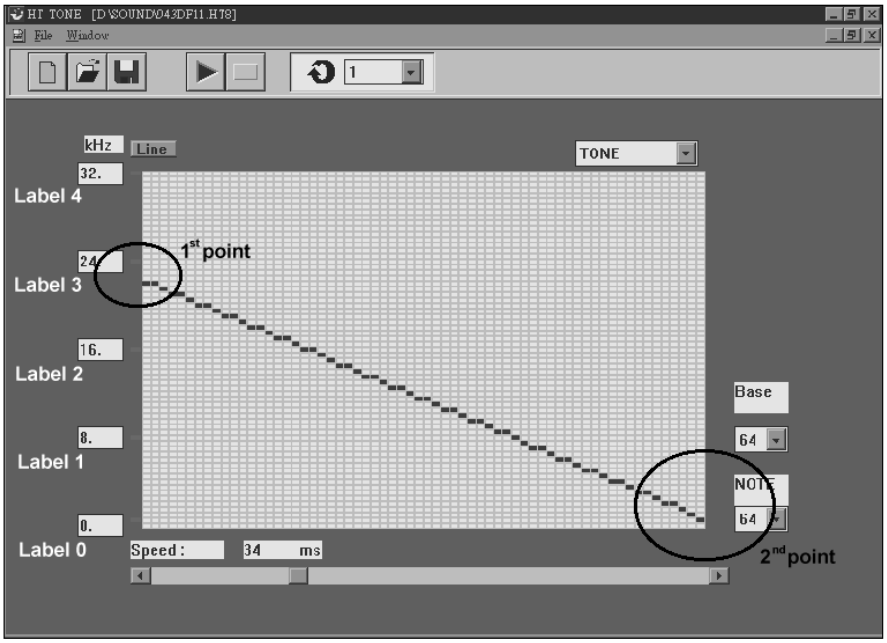
→ **Step 6 – SPEED**

We can scroll the speed bar to change the playing time of each note. For example, if the tone file has 32 notes, and the speed of each note is 34ms, we will know that the playing time of this file is 32×34ms.

→ **Step 7 – EDITING Mode**

There are two editing modes for the user to ′draw′ the frequency of each note.

- DOT Mode
  The drawing unit is ″NOTE″ Press the mouse left button and drag it, we will get a curve in the editing window, as previously shown.
- LINE Mode
  The drawing unit is ″LINE″. Click the mouse left button, we will get the first point of the ″LINE″. Then click another note to get the second. A line will be drawn between these two points as shown in the diagram on the next page.



→ **Step 8 – Frequency Label**

As mentioned in step 4, if the Base Frequency is 64K, then the max. frequency of this tone file will be 64/2=32K. For this reason the maximum value of Label 4 has been designed to be 32.

The frequency can be examined in more detail or finer adjustments can be made to its value using the following method.

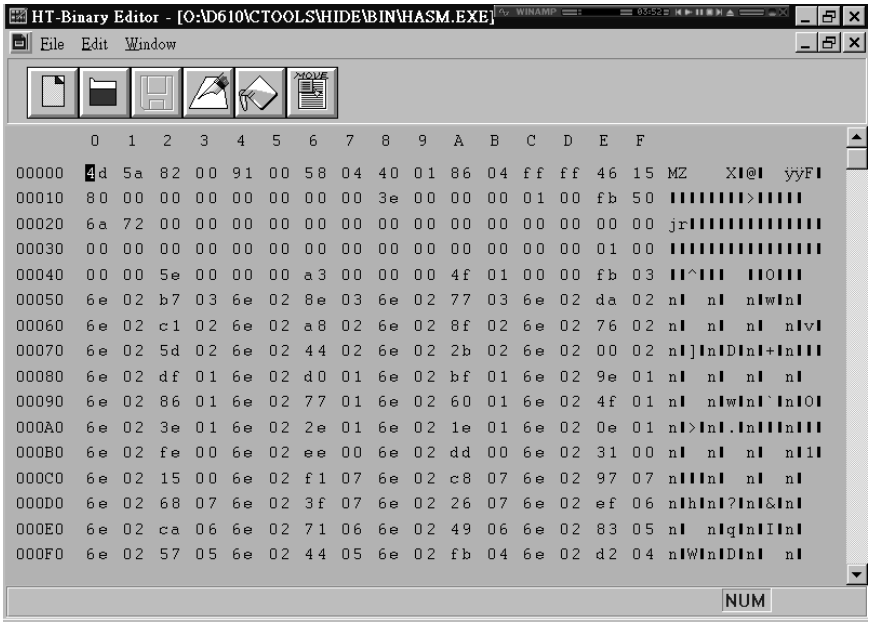
As an example, if the value of Label 4 is 32K and if we draw a line between Label 0 and Label 1, i.e. between 0K and 8K, then this line will only be set to an approximate frequency. If Label 4 is set to 8K then this will allow us to reduce the frequency range displayed and subsequently allow the notes to be set to a more precise frequency.

Chapter 6

Using HT-Binary Editor

6

This chapter explains how to edit a binary file and describes the menu commands. The main screen of the HT-Binary Editor is shown below. This is a simple binary editor used to communicate with HT-VDS84.

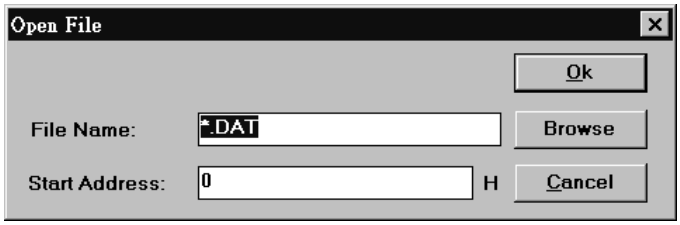


Creating a New File

To create a new file, select the New command from the File menu, or press the button. Then begin to input data (Hex) in the editing area.

Opening a File

To open a file, select the Open command from the File menu, or press the button. The following Open File dialog box appears:

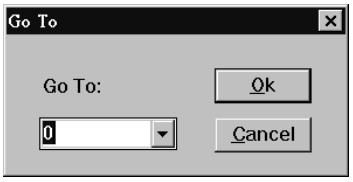


Type in the full path, or press the Browse button to select a file, and input the starting address from where the file is loaded in the Start Address edit box.

Editing

→ **Go To**

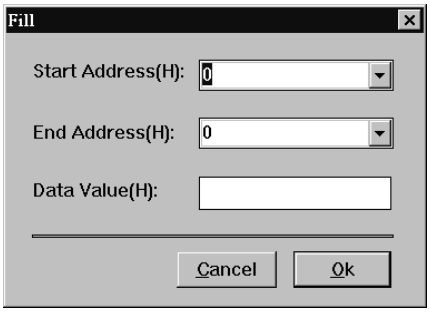
To go to a specific position, select the Go To command from the Edit menu, or press the button. A Go To dialog box appears:



Type in the position you want to go (in Hex), and press the Ok button.

→ **Fill**

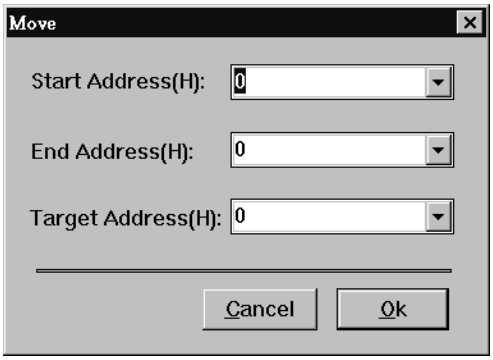
To fill a range with a data (in Hex), select the Fill command in the Edit menu, or press the button. A Fill dialog box appears:



Type in the Start Address, End Address and data in Hex, and then press the Ok button.

→ **Move**

To copy data from a specified range to a target address, select the Move command in the Edit menu, or press the button. A Move dialog box appears:

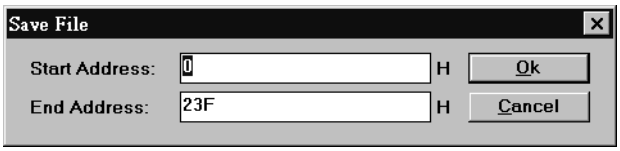


Type in the Start Address, End Address and Target Address, and then press the Ok button.

Save

→ **Save**

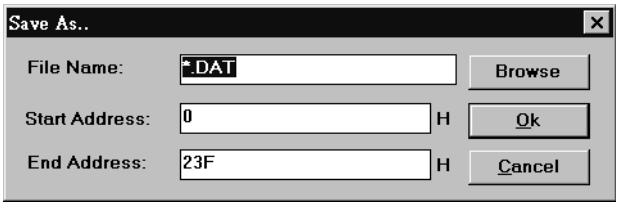
To save a file, select the Save command from the File menu, or press the button. A Save File dialog box appears. If the file name is not specified, a Save As.. dialog box will appear.



Type in the Start Address and End Address you want to save, and then press the Ok button.

→ **Save As ..**

To save the current file under another name, select the Save As command in the File menu. A Save As .. dialog box appears:



Type in the full path in the File Name edit box, or press the Browse button to select a file. Input the Start Address and End Address you want to save, and then press the Ok button.

Other Commands

→ **Short Menu or Full Menu/File**
Short menu/Full menu switch command.

→ **Exit/File**
Close the system.

→ **About HT-Binary Editor*/File**
Show information about the system.

→ **Tile or Arrange/Window**
Tile (it is called Arrange in short menu) all opened files on the screen.

→ **Cascade/Window**
Cascade all opened files on the screen.

→ **Arrange Icons/Window**
Arrange all icons on the screen.

→ **Close All/Window**
Close all opened files on the screen.